

Bat Activity within Urban and Rural Landscapes in Arcata, California

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Introduction

- Bats have been affected by various anthropogenic factors such as land conversion, displacing their establishment (Moretta 2017).
- My hypothesis is that bat abundance will be lower in foraging areas in urban areas compared to natural areas.

Objectives

- This study was conducted to determine the activity of 3 bat species: California myotis (*Myotis californicus*), silver-haired bat (*Lasionycteris noctivagans*), Mexican free-tailed bat (*Tadarida brasiliensis*) (Fig. 1).
- Locations were selected based on possible foraging habitat and nearby open & edge habitat (Seidman 2001).
- Collect temperature and create building index with every building in each cardinal direction.

Methods

- Data collection began February 13 through April 7, 2023.
- Areas were urban and natural habitats around Arcata Community Forest, Arcata Sports Complex, along Highway 101, and Cal Poly Humboldt Campus (Fig. 2).
- Audio recorder was placed at the site prior to sunset and collected calls throughout three nights beginning around sunset (18:00) and concluding at sunrise (7:00).
- Data was collected for 3 nights consecutively, whenever possible.

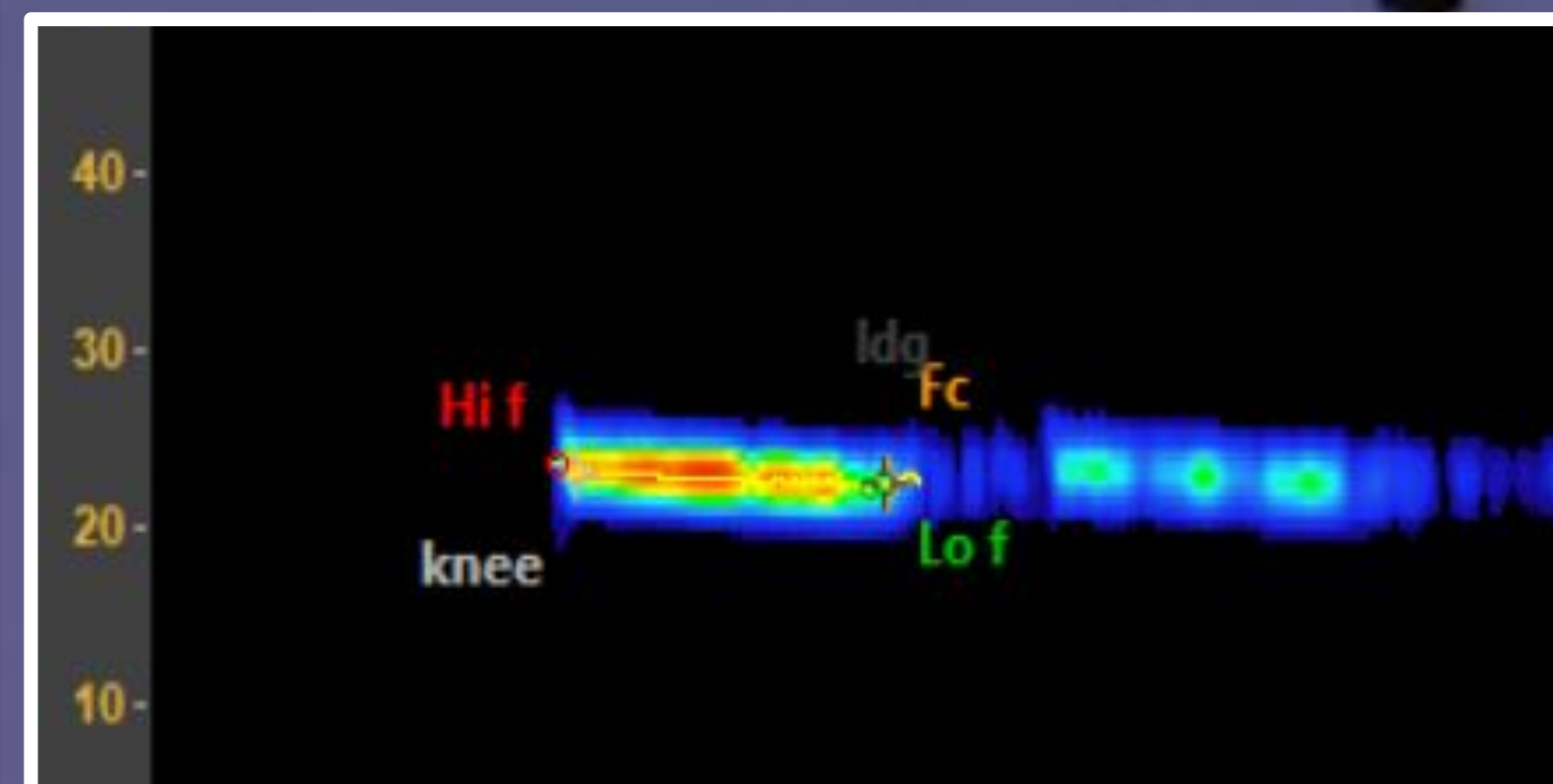
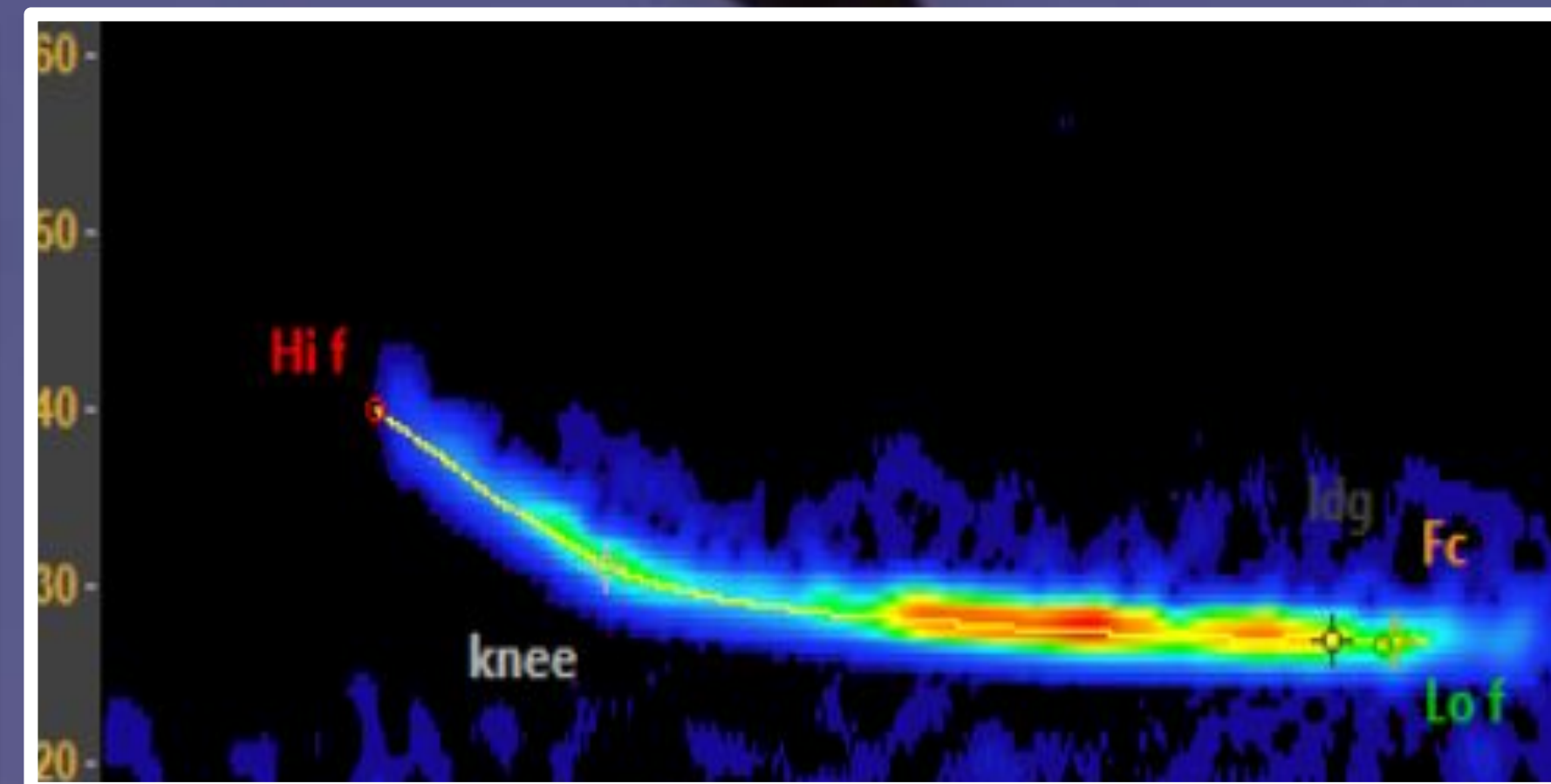
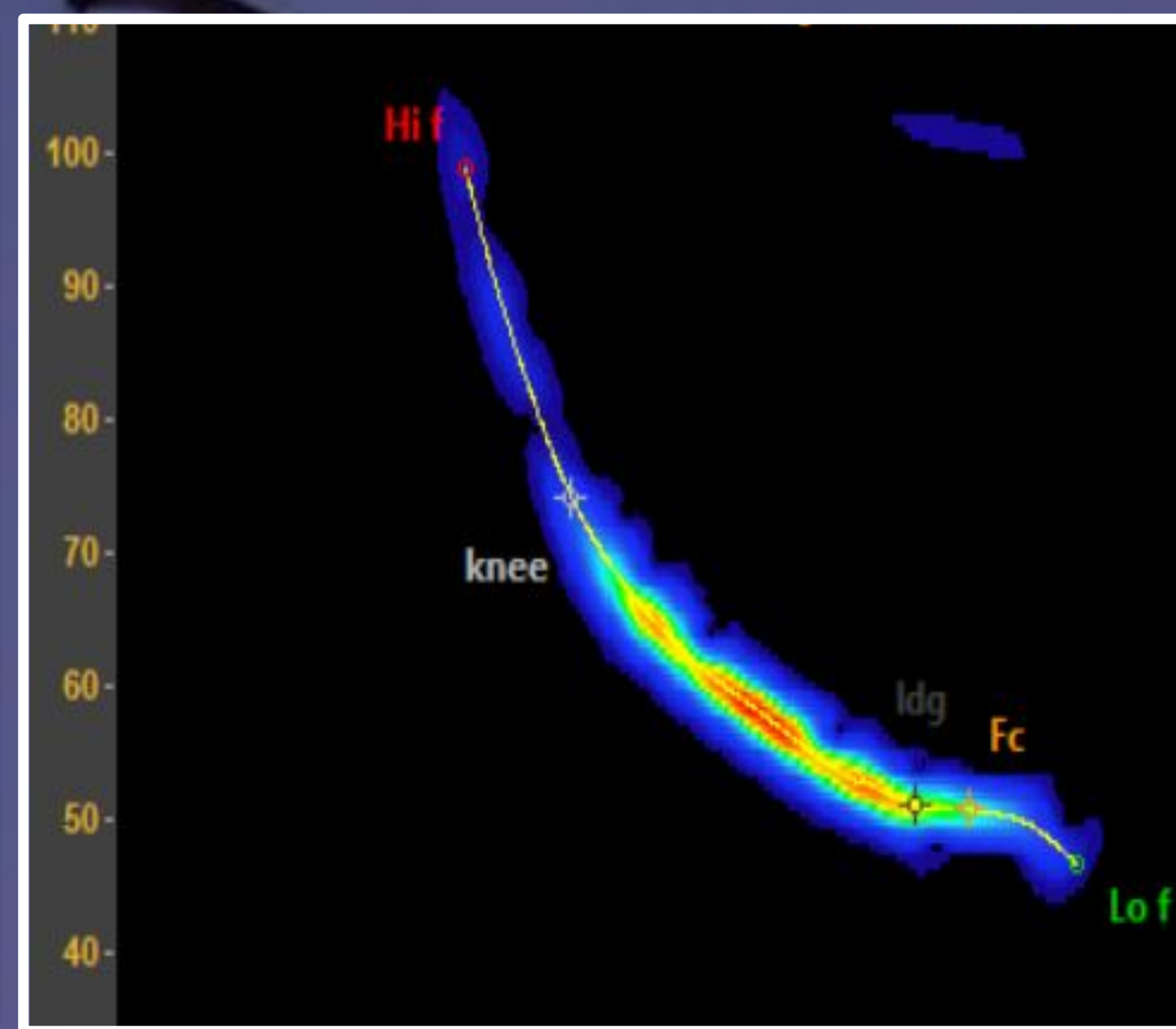


Figure 1: The three species being monitored are, top to bottom: California myotis, silver-haired bat, Mexican free-tailed bat

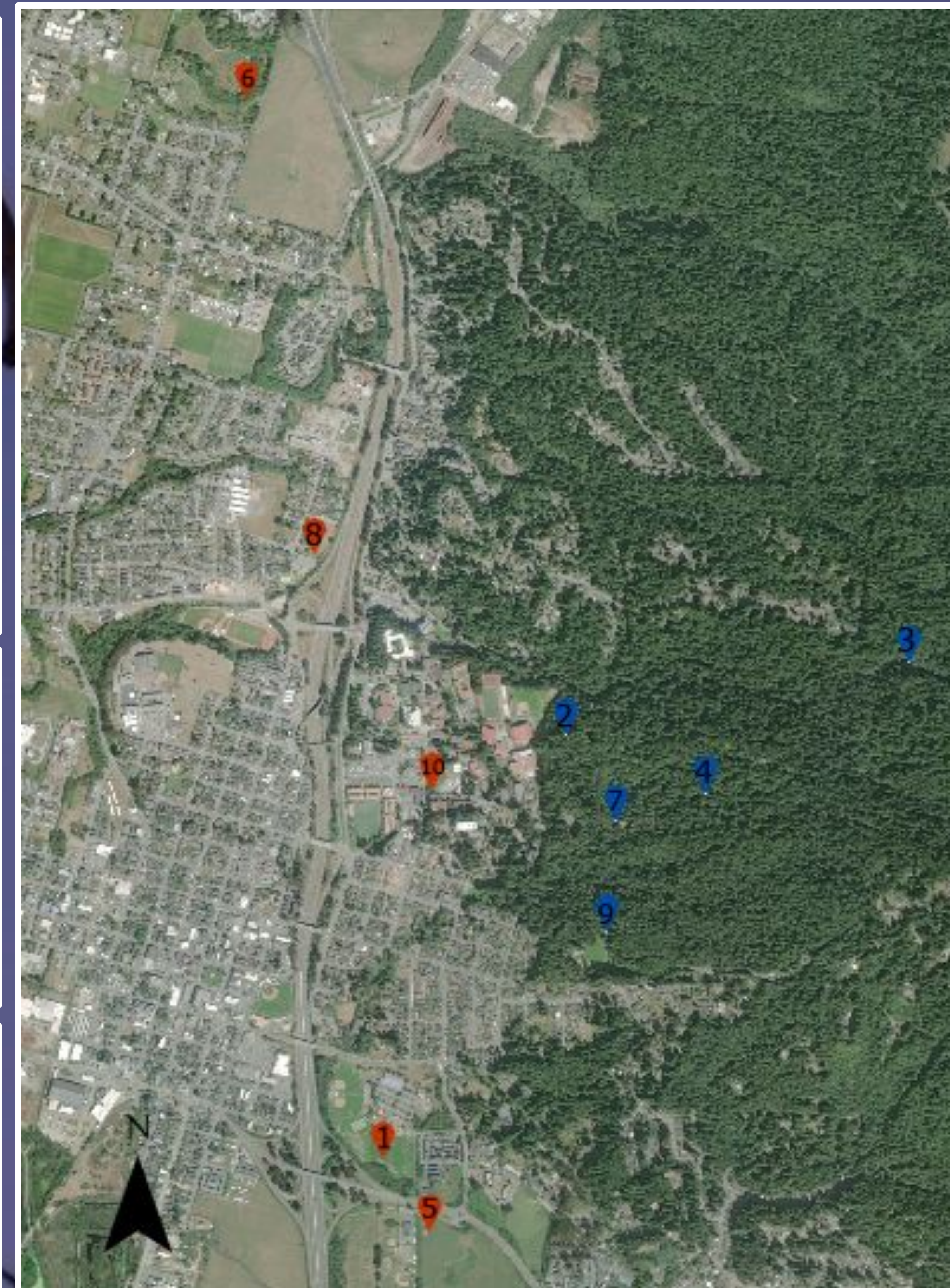


Figure 2: Map of all 12 sites throughout Arcata, red markers being urban and blue markers being natural. Most active sites - 2, 8.

Results

- Total of 943 calls analyzed throughout 30 nights, 563 in natural, 380 in urban.
- No correlation in overall bat activity compared to temperature, habitat and number of buildings.
- California myotis and Mexican free-tailed bat were significantly correlated with the increase of buildings (Fig. 3)

	California myotis	Silver-haired	Mexican free-tailed
natural	129	182	235
urban	115	12	253

Dependent Factors	Independent Factors	P-Value <0.05
Bat Activity	Anthropogenic Buildings	0.88
	Temperature	0.85
	Habitat of sites	0.84
California myotis and Mexican free tailed bat	Anthropogenic Buildings	0.51
	Anthropogenic Buildings in Urban Sites	0.00012

Discussion

- Silver-haired bats were not seen as abundant in urban landscapes.
- Improvements for study
 - Include diverse sites & upgrade audio equipment.
- Further research can monitor bat activity within urban and natural gradients in CA.

Acknowledgments

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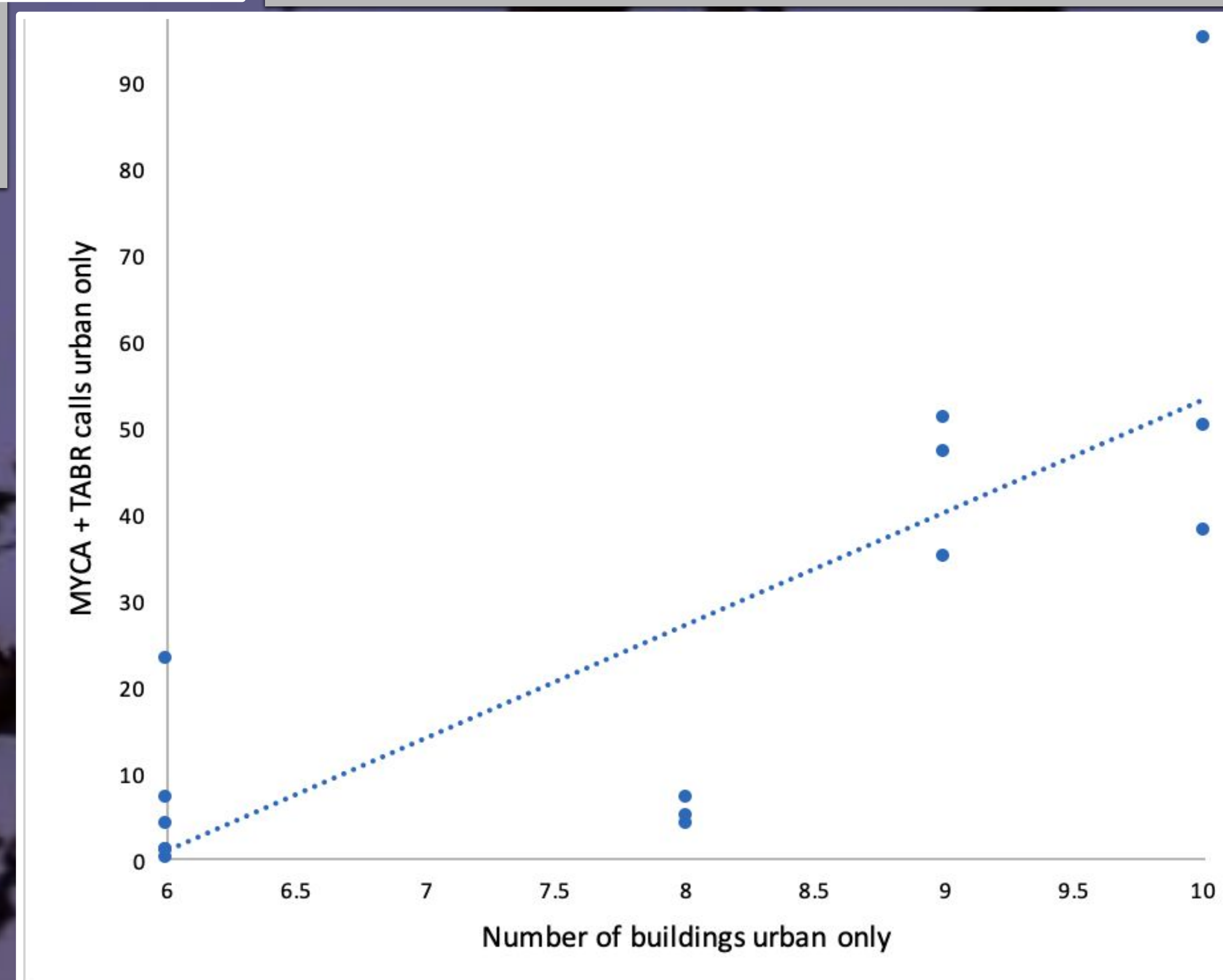


Figure 3: Two species of interest, California myotis and Mexican free-tailed bat, have a correlation in increased activity with the rise in number of buildings ($r(s) = 0.382$, $n=15$, $P\text{-value} < .001$)

Literature cited
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